istry, on "The Resins and their Chemical Relations to the Terpenes"; Vice-President A. L. Rotch, before the Section of Mechanical Science and Engineering, on "Aërial Engineering"; Vice-President Jacob Reighard, before the Section of Zoology, on "Adaptation"; Vice-President R. A. Harper, before the Section of Botany, on "Some Current Conceptions of the Germ Plasm"; Vice-President R. B. Dixon, before the Section of Anthropology and Psychology, on "The Independence of the Culture of the American Indian"; Vice-President Theodore Burton, before the Section of Social and Economic Science, on "The Cause of High Prices"; Vice-President F. G. Novy, before the Section of Physiology and Experimental Medicine, on "Carriers of Disease"; Vice-President A. Ross Hill, before the Section of Education, on "The Teaching of General Courses in Science." (Owing to the death of Vice-President Christopher W. Hall, of the Section of Geology and Geography, no address was delivered before that section.)

The meeting showed, as in other recent years, an increased number of affiliated scientific societies of national scope, and was marked by the presence of the strong group of societies of economic character, including the American Economic Association, the American Statistical Association, the American Association for Labour Legislation, the American Sociological Society, and the American Home Economics Association.

As has been the growing tendency in the association, several important symposia were held, and a number of meetings of interest to several sections and societies. Among these may be mentioned a symposium relating to safety in mines; one on aërodynamics, and another on good roads; one on ten years' progress in vertebrate palæontology; one on mineral wastes and conservation, and a joint session of the zoologists and psychologists on questions relating to animal behaviour. A most important conference on psychology and medical education was held at the Government Hospital, in which eminent psychologists and alienists discussed pertinent questions. The Botanical Section held a symposium on soils, and another on modern aspects of palæobotany. Still another symposium was conducted on acapnia and shock.

The council passed resolutions favouring the establishment of a national quarantine and inspection service directed against the introduction of injurious insects and plant diseases, and others favouring the establishment of a national department of health. Reports of delegates to several international congresses were read.

The general committee selected Cleveland, Ohio, for the place of the next meeting, to open December 30, 1912, and recommended to the following general committee that Atlanta, Georgia, be selected for the meeting in the winter of 1913–14. It also expressed the desire that arrangements for a summer meeting during 1915 be made.

The following officers for the ensuing year were elected:—*President:* Dr. E. C. Pickering, director of the Harvard Astronomical Observatory, Cambridge, Mass. *Vice-Presidents* (*or Presidents of Sections*): Section A, E. B. Van Vleck, University of Wisconsin, Madison, Wis.; Section B, A. G. Webster, Clark University, Worcester, Mass.; Section C, W. Lash Miller, Toronto, Canada; Section D, J. A. Holmes, Bureau of Mines, Washington, D.C.; Section E, J. E. Todd, University of Kansas, Lawrence, Kansas; Section F, W. A. Locy, North-Western University, Evanston, Illinois; Section G, D. S. Johnson, Johns Hopkins University, Baltimore, Maryland; Section H, J. Walter Fewkes, Smithsonian Institution, Washington, D.C.; Section I, J. Hays Hammond, New York, N.Y.; Section K, J. J. R. Macleod, Western Reserve Medical College, Cleveland, Ohio; Section L, J. McKeen Cattell, Columbia University, New York, N.Y. *Secretaries of Sections:* Section B, W. J. Humphreys, U.S. Weather Bureau, Washington, D.C.; Section E, George F. Kay, University of Iowa, Iowa City, Iowa; Section K, Waldemar Koch, University of Chicago, Chicago, Illinois. *General Secretary:* Henry E. Summers, Iowa State College, Ames, Iowa. *Secretary of the Council:* H. W. Springsteen, Western Reserve University, Cleveland, Ohio.

The first meteorological gathering in connection with a meeting of the association was held in the Forecast Room of the Weather Bureau on December 28, the second day of the Washington meeting. As the interval of time between the morning and afternoon sessions of the various sections and societies was too short—and the meeting places were too widely separated—to admit of a "meteorological luncheon," in emulation of the British Association, a "meteorological tea" was decided on as the most practicable and agreeable form of gathering for the interchange of ideas among persons interested in the science of weather. After an hour spent in informal intercourse and an inspection of the buildings and installations of the bureau, five-minute talks were given on the subject, "The Relation of Meteorology to Other Sciences" by Prof. A. Lawrence Rotch ("Aëronautics"), Prof. E. B. Frost ("Astronomy"), Prof. Henry Crew ("Physics"), Prof. W. M. Davis ("Physical Geography"), Prof. W. I. Milham ("Education"). The chief of the Weather Bureau, Prof. Willis Moore, gave the address of welcome, and the speakers were introduced by Prof. W. J. Humphreys.

As a whole, both from the point of view of the attendance and the character of papers read and the general interest shown in the symposia, conferences, and important papers, the meeting undoubtedly will rank as the most important ever held.

The social features of the meeting were of great interest, receptions, dinners, smokers, and visits to the many places of interest in and about Washington more than occupying all the time which could be spared from the sectional meetings. The most notable social function was a reception to the lady visitors at the White House in the afternoon of December 28.

NOTES.

ON January 21 mathematicians of many countries will meet at the Sorbonne to do honour to M. Gaston Darboux on the jubilee anniversary of his entry at the Polytechnic School. As the successor, first of Liouville, and then of Chasles, M. Darboux has added lustre to two famous chairs, and by his published works has earned a reputation of the very first order. To Englishmen he is perhaps best known by his connection with the Bulletin, his researches on cyclides (in conjunction with Casey), and his admirable treatise on the theory of surfaces. The last-named work, both in style and method, may be compared with Salmon's classical treatises. Like Salmon, M. Darboux has an equal mastery of geometrical and analytical theories, and combines them with the happiest effect; like him, too, he has the power of drawing material from the most diverse sources, and fusing it into a homogeneous whole. In offering him our congratulations, we feel that we are expressing a sentiment shared by all who are acquainted with M. Darboux's scientific work; and we are sure that they will join with us in hoping that his energy and vigour may be long maintained.

THE possibility of the discovery of a remedy for cancer has been advanced a stage by the preparation by Prof. Wassermann, of Berlin, of a substance which possesses a curative action experimentally on cancer of mice. Prof. Wassermann reasoned that since the cancer-cells are growing rapidly, their oxygen requirements would be different from, and greater than, those of the cells of the body generally. He sought for some substance which might interfere with the oxygen supply to the cancer-cells, and finally adopted selenium as a means to do this. The next problem was to convey selenium to the cancer-cells by means of the blood stream, and after testing some hundreds of preparations a compound of selenium with an anilin dye eosin was found to fulfil this condition. If the eosin-selenium compound is injected into a healthy mouse it becomes pink all over, but if into a mouse with a cancerous tumour the tumour only becomes coloured, demonstrating the selective absorption of the substance. After two or three injections of the substance into a mouse the subject of cancerous tumours, the tumours are found to have softened, and after six to eight doses they become cystic, diminish in size, and finally disappear, and no recurrence takes place. The eosin-selenium compound is, however, poisonous, and a certain number of mice succumb under the treatment. Moreover, only small tumours (up to the size of a cherry) are definitely cured; with larger tumours so much disturbance ensues that the animals die.

THE death is announced, at seventy-one years of age, of Dr. Otto Liebmann, formerly professor of philosophy in the University of Jena.

IT is announced in the *Revue Scientifique* that M. Louis Gentil has been elected president of the French Geological Society for 1912, and M. Stanislas Meunier, Général Jourdy, Abbe Bourgeat, and M. Henri Boursault, vice-presidents.

AT the business meeting of the Association of Public School Science Masters on January 11 the following officers were elected for 1912:—President, Sir Archibald Geikie, P.R.S.; chairman, Mr. D. Rintoul, Clifton College; and Mr. D. Berridge, Malvern College, and Mr. F. M. Oldham, Dulwich College, honorary secretaries.

THE Rhodesia Scientific Association's gold medal, recently offered for an original paper advancing the knowledge of the transmission of any insect or arachnid-borne disease affecting Rhodesia, has been awarded to Dr. Edward Hindle, Beit memorial research fellow, for his paper on "The Transmission of *Spirochaeta duttoni*."

THE Geological Society of London will this year award its medals and funds as follows:—Wollaston medal, to Mr. Lazarus Fletcher, F.R.S.; Murchison medal, to Prof. Louis Dollo; Lyell medal, to Mr. Philip Lake; Wollaston fund, to Mr. C. I. Gardiner; Murchison fund, to Dr. Arthur Morley Davies; Lyell fund, to Dr. A. R. Dwerryhouse and Mr. R. H. Rastall.

MR. W. M. COATES, fellow, assistant tutor, bursar and lecturer of Queens' College, Cambridge, and one of the most successful mathematical coaches at the University, died on Tuesday, January 16, in his fifty-fifth year. Mr. Coates entered Queens' College in January, 1884, read mathematics with the late Dr. Routh, and was third wrangler in the Mathematical Tripos, part i., in 1886, and in the following year he was placed in Class I. of Division 2 of part ii. of the Tripos. He examined in the Mathematical Tripos in 1891 and 1892.

MR. F. H. SOMERS-GARDNER sends us a cutting from *The Gibraltar Chronicle* of January 4 which reads:—"On the leg of a seagull which was trapped by some fisher-boys yesterday at the eastern beach was found an aluminium ring bearing the inscription 'Museum Leiden 704.'—J.G.D." In reply to an inquiry, Dr. E. D. van Oort, of the 'S Rijks Museum van Natuurlijke Historie, Leiden, informs us that the seagull referred to is a black-headed gull (*Larus sidibundus*, L.) which was marked June 25, 1911, at Ellemeet, on the island of Schouwen, province Zeeland, Netherlands.

DR. A. R. WILLIS, who for the past forty years had been assistant professor of mechanics and mathematics at the Royal College of Science, South Kensington, retired from his post at Christmas. It is believed that many who have studied under Dr. Willis would welcome an opportunity to express their regard for him, and a committee of past and present students has been formed, therefore, to arrange for the presentation of a testimonial to him on his retirement. Subscriptions should be sent to the treasurer, Prof. A. Fowler, F.R.S., Royal College of Science, South Kensington, S.W., on or before the end of this month.

The British Medical Journal announces that the ninth annual congress of the Association Internationale de Perfectionnement Scientifique, which is under the patronage of the French Government, will be held on August 3–31 in the Balkans, in Turkey, and in Greece. The congress will be opened in Evian-les-Bains or Thonon-les-Bains, and will be continued at various other places. Persons wishing to present communications on subjects belonging to medicine, surgery, and the cognate sciences are requested to intimate their intention to the president, 12 Rue François-Millet, Paris XVI. The general secretary of the congress is Dr. Ghislain Housel.

WE learn from *The Times* that Captain Otto Fulton recently gave a private demonstration of his apparatus for the projection of pictures in natural colours by the method of opaque projection. In order to overcome the great loss of light inherent in this method, two powerful electric lamps illuminate the prints. These are ordinary black and white photographs taken, as usual in three-colour work, through blue, green, and red screens, respectively, and the images are superposed on the screen. The remarkable part of the method is that the colour screens used in the projection are stated to be white, pale green, and pale orange, but we are assured that the rendering of the colours of the original was remarkably accurate. The method is stated to be applicable to kinematography.

THE expedition of the Egypt Exploration Fund which, under the leadership of Prof. Naville, is now excavating for the third season in succession at Abydos, in Upper Egypt, reports (in *The Times* of Monday, January 15) that interesting discoveries have been made in the great necropolis, including tombs dating from the pre-dynastic age to the Roman period. "Of the latter a magnificent example was found. It consisted of a vaulted chamber, some 20 feet in length, built of mud bricks, and originally almost hidden in the sand. The building of another similar tomb over it at a slightly later date had saved it from the plunderer. On its floor lay twelve heavy coffins of limestone, each with its carefully sealed cover. Within each lay the mummy, carefully and laboriously wrapped in its linen bandages, the blue and gold of its painted coverings as fresh as when laid in the tomb two thousand years ago." Other burials are also reported, especially one of a woman of the twenty-second dynasty, who was found with all her ornaments, bead-necklaces, &c., including a ring of five scarabs, one of them bearing the name of Shishak, the conqueror of Jerusalem, and on her nose "still lay the small nose-ring of silver." Lastly, a burial of the twelfth dynasty may be mentioned; its period is known from an amethyst scarab, a stone rarely met with as used for scarabs after the time of the Middle Kingdom. These excavations have been carried on by Prof. Naville's assistants, Messrs. T. E. Peet, Whittemore, J. P. Droop, and the Hon. Robert Trefusis. On the arrival of Prof. Naville this month, the work of completing the excavation of the Osireion, the subterranean temple of King Meneptah (the supposed Pharaoh of the Exodus) will be taken in hand.

Mr. A. Rose, C.I.E., British Consul at Tengyueh, Yunnan, read a paper on the Chinese frontier of India before the Royal Geographical Society on Monday, January 15. The paper dealt mainly with the very interesting problems of political geography which have recently come into prominence in Asia, where China has of late years been active in increasing her influence on her southern and western frontiers. The lecturer dealt specially with that portion of the Chinese frontier which marches with that of Burmah, the region with which he was intimately acquainted, and described a hurried march to Hpimaw, close to the frontier. The frontier tribes were described and their characteristics discussed, while much interesting information was given concerning the systematic spread of Chinese influence over this border country in which suzerainty is claimed by China. An interesting collection of dresses and of metal and other objects made by these wild border tribes was also exhibited.

A second contribution by Dr. C. K. Edmunds, president of Canton Christian College, on science among the Chinese, appears in the January issue of *The Popular Science Monthly*. Some intimate students of Chinese literature and life claim that in many cases Chinese philosophy has anticipated the doctrines of modern science. During the Sung dynasty, in the century 1020–1120 A.D., lived several famous Chinese philosophers, of whom Chu was the most distinguished, and it is in his writings that these references are found which it is claimed foresaw modern views. Dr. Edmunds thinks it may be admitted that Chinese philosophers entertained some general ideas concerning an all-pervading medium, that they had clear ideas on mechanical action and reaction, and very crude views concerning the transformation of energy, which vaguely suggest those held to-day. He sees no just grounds for believing that they held any ideas comparable with the modern vortex motion in the æther, of the conservation of energy, or of biological or cosmological evolution. As he points out, the method of modern science is its distinguishing characteristic, and this was almost completely lacking among the Chinese.

In the summers of 1909 and 1910 Mr. Charles Rothschild had the good fortune to discover on trees near the Serpentine specimens of a minute fly of the psychodid group which proved to belong to a species previously unknown to science. This is described by the Rev. A. E. Eaton in the January number of *The Entomologist's Monthly Magazine* as *Telmatoscopus rothschildi*.

In the administration reports for 1910–11, Dr. J. Pearson, director of the Columbo Museum, pays well-deserved testimony to the services rendered to that institution by his predecessor, Dr. Arthur Willey (now Strathcona professor of zoology at McGill University), pointing out that during his eight years' term of office the building was enlarged, the collection greatly increased, and *Spolia Zeylanica*, the museum journal, founded. During his own term of office Dr. Pearson is enabled to record continued progress in the museum, but he pleads for further extension of the building, and likewise for additional library funds.

According to the January number of *The Museums Journal*, the experiment of giving illustrated explanations of the exhibits in certain sections of the Royal Scottish Museum on two evenings in each week to visitors has proved a decided success. The demonstrations are now held in the examination room of the University, which is sufficiently large to permit of the display of lantern illustrations of the objects in the collection, as well as of others which serve to throw further light on the subject of each demonstration. In the same issue an extract is reprinted, without comment, from a daily paper in which the writer alludes to musk-oxen, to say nothing of tigers, as Russian animals!

For some years past the Trivandrum Museum, Travancore, has issued only a brief summary of each year's work. It has, however, been decided that fuller reports are desirable, and the director, Colonel F. W. Dawson, has accordingly issued a combined report for the years 1904–9. During this period the museum appears to have made good progress, a special feature being the preparation of plaster casts of specimens that are difficult to prepare in other ways. So excellent are these casts (of which examples may be seen in the Natural History Museum, South Kensington) that Dr. Willey, while director of the Colombo Museum, paid a visit to Trivandrum in order to learn the technique of these castings. Another feature of the work of the museum is the number of cetaceans of various species which have been acquired and described during the period under review.

To No. 18 of the *Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg*, for 1911, Dr. N. V. Nasonov, director of the zoological museum of the academy, communicates a well-illustrated paper—unfortunately in Russian—on the mouflon and kindred species of wild sheep, the greater and more important part of the memoir being devoted to the forms commonly included under the title of Gmelin's sheep (*Ovis orientalis*). That species—then regarded as a race of the mouflon—was described in 1824 by Brandt and Ratzeburg, and stated to inhabit the "Ceraunian Mountains" of Persia, the Greek Islands, and Cyprus. As Persia is first mentioned, that country has generally been regarded as the type locality; but Dr. Nasonov accords this position to Cyprus, and therefore regards the Cyprian so-called *O. ophion* as the type of the species. The validity of this view will require careful consideration. In addition to the Cyprian sheep, *orientalis* is taken to include the Armenian *gmelini* and the Anatolian *anatolica* as local races. On the other hand, the sheep from the Lake Urmi district, originally described by Dr. A. Günther as *O. ophion urmiana*, is considered to represent a distinct species, with a local race (*erskinei*) from the Elburz Range, and a second (*isphahanica*) from the Ispahan district. Judging from the figures of the skulls and horns (for the text is incomprehensible to the writer of this note), Dr. Nasonov appears to rely largely on the direction of the horns in distinguishing *urmiana* from *orientalis*. In the former they extend far behind the occiput, while their tips do not descend much below the level of the teeth, whereas in the latter they curve downwards, so that their tips are far below the plane of the upper teeth. The local races seem, however, to show some degree of gradation in these respects; but the forms included in *orientalis* probably have a smaller development of the throat-ruff. Whether these features are of specific value is doubtful. In his latest communication on the subject Mr. Lydekker regarded *erskinei* as equivalent to the typical race of *orientalis*.

MR. C. H. O'DONOGHUE contributes to the current number of the *Quarterly Journal of Microscopical Science* (vol. lvii., part ii.) an interesting memoir on the mammary glands of the Australian marsupial cat (Dasyurus). The gland arises as outgrowths from the follicles of certain hairs which appear on the rudiment of the teat, and these hairs, which subsequently disappear, are equal in number to the main milk ducts in the adult teat. The author also discusses the causes which contribute towards the hypertrophy of the mammary gland during pregnancy and at other times, and concludes that the stimulus to growth is not a nervous one, but is due to an internal secretion or hormone circulating in the blood. It has long been known that there is an intimate correlation between the presence of the corpora lutea in the ovary and the fixation of the fœtus to the uterine wall, and it is supposed that the corpora lutea are glandular bodies the secretion of which, conveyed by the blood, stimulates the wall of the uterus to undergo the necessary changes in preparation for the reception of the fœtus. Mr. O'Donoghue gives good reasons for believing that the secretion of the corpora lutea also stimulates the mammary glands, and thus causes their enlargement, although other factors are probably responsible for causing the actual secretion of milk. We note that Mr. O'Donoghue makes use of the German term "Anlage," where, as it appears to us, "rudiment" would be greatly preferable.

THE third volume of the Indian Forest Records begins with an important part prepared by Mr. R. S. Troup, in which the author examines statistical and other information regarding the teak forests of Burma. It is noted that the limits of natural teak forests, except to the east, lie within the province. The total area of teak forests cannot be computed, but with regard to the reserved forests, exceeding 25,000 square miles, rather less than one quarter is returned as teak-bearing (which implies about 6 per cent. of the growing stock). The greater part of the teak forests may be designated either as "upper mixed," occupying hilly country and characterised by the prevalence of bamboos, or as "lower mixed," on flat ground. In the former class distinction is drawn between dry forest, where *Dendrocalamus strictus* is a common bamboo, and moist forest, which often contains *Bambusa polymorpha* or *Cephalostachyum pergracile*. According to available figures, teak trees require 110 to 190 years to reach a girth of 7 feet, upon which basis the exploitable age has been fixed at 150 to 180 years.

Petermann's Mitteilungen for December, 1911, contains a map of the world to show the state of our knowledge regarding the relief of the earth's surface. Five grades are employed, both on land and sea areas, to classify the data according to their completeness. Over the oceans the number of soundings in a 1° square (2° beyond the 60th parallel) is used as the basis of classification, but on land the scale on which maps have been published is adopted on the assumption that the density of points of which the altitudes have been determined, and the accuracy of the results, are comparable with the scale on which maps are published. A close investigation of every land area to determine the density of determined altitudes and the accuracy of the determinations would be a long piece of work, but it is the only satisfactory way of arriving at the present state of our knowledge of the earth's relief.

MR. E. K. SUVOROF explored the Commander Islands in the summer of 1910, and his observations are described in the Izvestiya of the Russian Geographical Society (No. 6, 1911). The group consists of four islands, the well-known Bering and Copper Islands, and two small ones which, having no fresh water, are inhabited only by innumerable birds. Bering Island consists of two parts, a northern, low, and covered with tundra, and studded by a few hills not reaching 600 feet, and a southern, which is a chaotic mass of elevations in chains and groups attaining a height of 2200 feet, and is almost inaccessible except along the coast. Volcanic tuff is the prevailing formation. The northern tundra has been formed by the silting-up of lakes which were originally inlets from the sea, and have been cut off from it by upheaval of the land. In some places may be noticed two, or even three, clearly marked terraces. One of the lakes still in existence, the Sarannoie, is supposed by the natives to be of unfathomable depth, but Mr. Suvorof found its deepest hollow sounded only 57½ feet. Nor are the reports of its extraordinarily low temperature correct, for on July 4 the temperature fell from 54·3° F. at the surface to 50°. Copper Island has a more complicated geological structure. Tuff and tuff conglomerate certainly predominate, but dacite, basalt, augite, and andesite occur on the north-east coast. The line of coast is determined by a fault. The inhabitants of the islands, Aleuts, with an admixture of several other elements, keep a few cattle and pigs and catch salmon, cod, blue foxes, and sea-otters, the last almost exclusively at Copper Island.

AMONG the very useful summaries of the geology of British districts, prepared by specialists and published in the Proceedings of the Geologists' Association, should be mentioned those on "The Districts around Settle and Harrogate," by Prof. Percy F. Kendall (vol. xxii., 1911, p. 27); on "The District around St. David's, Pembrokeshire," by Mr. J. F. N. Green (*ibid*., p. 121); on "The Neighbourhood of Fort William," by Mr. E. B. Bailey; on "The Neighbourhood of Broadford, Skye," by A. Harker; and on "The Geology of the Cuillin Range," by Mr. W. F. Gwinnell. The last three follow one another in part 4 of vol. xxii., pp. 179–214. The photographic illustrations and the sections in these papers make them additionally serviceable to teachers. In plate xi. the famous unconformity at the Arco Wood Quarry, Ribblesdale, is reproduced, and the view of Ingleborough (plate xii.) is one of the finest that we know. Prof. Kendall publishes (p. 37) his conclusion that the Yoredale and Pendleside series are really contemporaneous, a matter on which much more is certain to be written. Mr. Bailey's paper includes a description of the "cauldron-subsidence" of Glencoe and of the igneous history of Ben Nevis, where sinking is also recognised, and where it accounts for the preservation of the summit andesites in an encircling ring of granite.

AT the meeting of the Vienna Academy of Sciences on November 30, 1911, Prof. J. Hann submitted a work entitled "Results of Dr. E. Glaser's Meteorological Observations at Sana (Yemen)." The observations were made between January and October, 1883, only, but as no complete data for the interior of Arabia were previously available, the present carefully made series is of considerable interest. By comparison with observations for corresponding months at stations on the adjacent coast, and the use of interpolation formulæ, Dr. Hann was able to deduce very approximate monthly and yearly values of pressure and temperature. The regularity of other phenomena also made it possible to obtain mean values for them also, rainfall being the most uncertain. The mean pressure (altitude 2370 metres) is:—winter, 577·5 mm.; summer, 573·3; year, 575·5; temperature for same periods, 14·2°, 20·6°, 17·5° C. Mean annual humidity, 50 per cent.; rainfall, 452 mm. The daily range of temperature is very large, especially in winter. The mean minimum in winter is about 4·8°, mean temperature at 2h. p.m., 24°; in summer, 13·5° and 25·8° respectively. Once in February −0·4° was recorded (which is not unusual on the plateaux); the absolute maxima at 2h. p.m. often exceed 30°, and a reading of 33° has been recorded by the maximum thermometer. In 1883 the rainy period lasted from March to August, with a complete break in June (which was abnormal). During thunderstorms rain and hail showers are often heavy (on July 23, 52 mm.). From May to October north and north-east winds, January to April south winds, were most prevalent; the latter are mostly light morning breezes; all the stronger winds are northerly, and sometimes reach storm force.

The Scientific American for December 23, 1911, contains an illustrated one-page article on Sir Joseph Thomson, by Dr. P. Phillips. It gives a short sketch of his education, and describes how Sir Joseph, after his appointment as professor of experimental physics at Cambridge when a "mere boy," gradually built up the present school of research and made the Cavendish Laboratory famous throughout the world. A clear picture is drawn of the great master amongst his students; and at this stage the author cannot keep up the formal references to "Sir J. J. Thomson," but lapses into the old affectionate "J. J." The portrait which illustrates the article shows Sir Joseph in a very characteristic attitude.

The Central for December, 1911, has an interesting article on a new aluminium industry, by Mr. A. V. Hussey. It describes the methods used in the manufacture of large vats and tanks from sheet aluminium. The joints, which are generally butt joints, are welded by means of an oxy-hydrogen blow-pipe, which melts the metal at the joint, while a special flux dissolves the oxide formed and allows the two edges of metal to run together. When the joint has been trimmed and hammered it is as smooth as the rest of the sheet, and under test proves as strong as the unworked parts. The development of the industry has apparently been in the hands of old students of the City and Guilds College throughout. The editors appeal to old students for their views as to the values of individual portions of the three years' course at the college. These may be of special value, as it is not often that those taught get an opportunity of expressing themselves. We trust the anxiety expressed by the editors as to the future of the Old Students' Association, owing to the numerous changes now taking place at South Kensington, will prove to be unfounded.

Optical wedges have been in use for a long time, but the graduated tint was always narrow in proportion to its length. It is only about eighteen months ago that Dr. Goldberg suggested the use of "wedge-screens," and showed how they could be produced by casting pigmented gelatine in a mould of two sheets of glass that touch at one edge, and are slightly separated at the opposite edge. Wedge-screens are now made of great accuracy by Messrs. Ilford, Ltd., and at a recent meeting of the Royal Photographic Society Mr. Renwick described some of their uses. The essential feature of the wedge-screen is that it is wide, that is, square or approximately square, and this allows of another plate upon which, for example, a graduated tint has been produced for testing purposes, being rotated upon the wedge-screen. If the gradation of the plate is exactly the same as that of the screen, and they are brought face to face in reversed positions, the two together give a uniform tint. Then, knowing the values of the screen, the gradation of the plate is known also. But if the two gradations are not equal, by isolating a strip and rotating the one upon the other it is possible to get the visible strip of equal density throughout its length; and Mr. Renwick showed the exact relationship between the angle of rotation and the comparative steepness of gradation of the screen and the plate, whether the plate is steeper or less steep than the screen. The one screen plate, therefore, permits of the measurement of the steepness of gradation of any plate, the screen with its known values being the standard, without the use of any photometric instrument, except perhaps in a secondary sense and of the simplest description, to determine the equality of the density of the observed strip.

In connection with the application of photography to the detection of adulteration, the current (January) number of *The World's Work* contains some interesting reproductions of photomicrographs, by Mr. Ernest Marriage. Of these, the following may be specially mentioned:—pure apple jam; "improved" strawberry and gooseberry; "improved" raspberry and currant; pure blackcurrant jam; blackcurrant "improved" with fruit jelly. In all these samples of so-called "improved" jams the characteristic apple-cells are clearly discernible. The photographs are published in illustration of an article by "Home Counties" entitled "Unsophisticated Jam."

The Bulletin of the St. Petersburg Academy of Sciences, part xv. of 1911, contains an important paper, by Prof. Walden, of Riga, on formamide as an ionising solvent. This solvent has the property of imitating in a remarkable degree the physical characteristics and constants of water. In the present paper its behaviour as a solvent in cryoscopic measurements and the electrical conductivity of its solutions are described. It is shown that when binary salts are used as solutes, solutions are obtained for which the coefficient of ionisation may be even greater than in water. Moreover, the cryoscopic and the electrical measurements agree in giving concordant figures for the coefficient of ionisation over a range of dilutions from 5 to 100 litres per gram-molecule. Strong organic acids, such as tribromoacetic acid, do not, however, become ionised to any marked extent when dissolved in formamide. It was found that starch dissolved in formamide gave a molecular weight $M=645$, corresponding with the formula $(C_6H_{10}O_5)_4$, and that its specific rotatory power was +189°. Casein gave a molecular weight $M=400$, and specific rotatory power −106° to −88°.

The *Revue generale des Sciences* of December 15, 1911, contains an article by M. Lamotte on the recent work of the Cryogenic Laboratory of Leyden. An account is there given of the methods used in liquefying helium on an extensive scale, and two diagrams are reproduced to show the arrangement of the apparatus. The work recently carried out with the help of liquid hydrogen and liquid helium includes:—(1) a determination of the critical pressure of neon (29 atmospheres) and of its pressure at the triple point (35 centimetres); (2) an investigation of the constants of argon; (3) measurements of resistance of metals at low temperatures, whereby it has been shown that the resistance of gold and of mercury falls almost to zero at 3° A.; at this temperature the resistance of mercury is less than one ten-millionth of its value at 0°, whilst at 1·5° A. it is still smaller; (4) investigations of magnetic susceptibility and thermoelectric force. Attention may also be directed to two articles on the fixation of atmospheric nitrogen in the same journal of November 30 and December 15, 1911; these are accompanied by a series of interesting and unfamiliar illustrations.

THE first number of *The Chemical World* is a very readable production. The new journal is a monthly periodical published by Messrs. J. and A. Churchill; its aim is "to present to those interested in the many branches of chemistry an account of progress in both theory and practice." Written from this viewpoint, a number of short articles deal with various topics of chemical interest, and form the chief feature of the magazine. Among these are "The Detection of Mydriatic Alkaloids," by Mr. F. H. Carr, discussing a problem which arose recently in a notable murder trial; "The Chemical Characterisation of Soils," a useful contribution by Dr. E. J. Russell; "The Recent Progress of Organic Chemistry," in which Dr. A. Clayton describes Knorr's isolation of the ketone and enol forms from ethyl aceto-acetate; and a summary of "Metallurgical Progress in 1911," by Mr. G. T. Holloway. An illustrated article on the chemical department of the Royal College of Science, with a portrait of Sir Edward Thorpe, is the first of a series of similar accounts which will deal with the chemical establishments of modern universities and technical colleges. Other serial contributions commenced are one by Mr. E. Hatschek on "The Physics and Chemistry of Colloids," and one on "Chemical Research" by the editor. Sections are also devoted to physical chemistry, chemical engineering, and chemical industries, whilst patents and commercial matters are not forgotten. Thus the new venture appeals to many interests, and, judging by the first issue, it deserves a cordial welcome.

IN a paper on the direct experimental determination of the stresses in the steel and in the concrete of reinforced-concrete columns, read before the Institution of Civil Engineers on January 9 by Mr. W. C. Popplewell, is described a method of measuring the simultaneous shortening of the steel bars and of the concrete. Martens extensometers were used; for the steel these were applied to the ends of pairs of pins projecting from the reinforcing bars through holes in the concrete; for the concrete the extensometers were applied to the surface as near as possible to the steel. The elastic moduli for the steel and the concrete were thus found to be 30,200,000 and 1,535,000 lb. per square inch respectively. A further set of experiments carried out to determine the intensity of the frictional grip of the concrete on the steel resulted in values ranging from 300 to 600 lb. per square inch of bar surface, to cause slipping. When all the effects of eccentric loading have been eliminated from the results of the tests on columns, there is no evidence to indicate that slipping took place. In columns of this kind, made up with plain smooth bars, the two materials behave like one, so far as their strain effects are concerned.

AN article on propeller erosion in *Engineering* for January 12 gives an account of a research conducted by Dr. O. Silberrad, of Buckhurst Hill, Essex, in conjunction with the Manganese Bronze and Brass Company, Ltd. Propellers driven by comparatively slow-running reciprocating engines are free from erosion when constructed of manganese bronze. When, however, the same alloy was used for turbine-driven propellers erosion reappeared, and often of a very serious character. In the case of the *Mauretania* and *Lusitania*, had no remedy been found the propellers would have required replacing every few months at a cost of some thousands of pounds. Each propeller weighed about 20 tons, and the cost ranges from 130*l.* to 180*l.* per ton. The erosion seems to have been due to the eutectic being washed away, the mixed crystals constituting the main mass of the alloy being practically unaffected. The research has been successful in the discovery of an alloy which is now in actual service on the *Mauretania*, and has proved itself practically inerodible. The new alloy is patented conjointly by Mr. P. R. Parsons, of the Manganese Bronze and Brass Company, and Dr. Silberrad, and is called Parsons' New Turbadium. It has a tensile strength of 38 to 40 tons per square inch, an elastic limit of 18 to 19 tons per square inch, and an elongation of 15 per cent. on 2 inches. In the erosion tests it showed an endurance about five times that of ordinary high-tension bronze, and this result has been confirmed in actual service. We understand that the British Admiralty has approved its use for the propellers of war vessels fitted with turbine engines.

THE thirty-ninth issue of "Willing's Press Guide," that for 1912, has, as usual, been carefully revised, and well maintains its character as a handy and easily consulted index to the Press of the United Kingdom and to the principal colonial and foreign periodicals. A variety of general information adds to the value of the volume.

A COPY of a convenient monthly weather chart for daily observation has been received from Messrs. George Philip and Son, Ltd. Provision is made for a record of readings of the wet and dry-bulb thermometers, maximum and minimum thermometers, rain-gauge, and barometer. Space is also allotted to wind and weather observations. The price of each sheet is one penny.

A NEW and enlarged edition of "Soap-bubbles: their Colours and the Forces which Mould them," by Prof. C. V. Boys, F.R.S., has been published by the Society for Promoting Christian Knowledge. The several new and original sections which the present issue contains provide, like the lectures Prof. Boys has been giving lately to the Royal Society of Arts juvenile audiences, still further evidence of the author's genius for experimenting and his talent for clear and interesting exposition. The price of the new edition is 3*s.*

SIR EDWARD THORPE's well-known "Dictionary of Applied Chemistry" is being revised and enlarged, and Messrs. Longmans and Co. announce that the new edition will be issued in five volumes. The first volume will be ready in a few days, and vol. ii. early in the summer. It is hoped that the work will be completed within two years. Messrs. Longmans announce also that the work on "Surgery," by Sir W. Watson Cheyne and Mr. F. F. Burghard, has been entirely revised and rewritten with the assistance of Mr. T. P. Legg and Mr. Arthur Edmunds. The first volume will be issued before the end of the present month, and vol. ii. in April next.

OUR ASTRONOMICAL COLUMN.

POSSIBLE CHANGES IN SATURN'S RINGS.—At the meeting of the Royal Astronomical Society, held on Friday last, it was announced that a telegram had been received, by Sir David Gill, from Prof. Todd, in which he said:—"Near the extremities of the major axes of the bright outer ring of Saturn, with the aid of a powerful telescope, I have